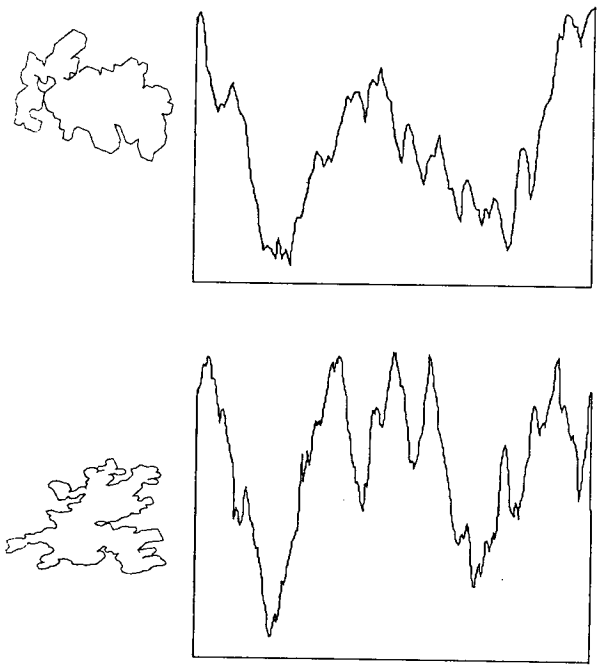

Fig. 16 — LANDSAT contours and shape functions

coefficients form a natural set of invariant features that can be used for coding a feature vector. The shape function method is well suited to real-time applications that require special purpose hardware, such as VLSI array processors implementing FFT algorithms. Shape function algorithms can also be simulated on a wide variety of current parallel computers (e.g., a Hypercube or a Connection Machine).

In the future, massively parallel computers based on neural network architectures will become available. To date, training of neural network computers based on popular learning algorithms such as backpropagation has been slow. Faster methods of unsupervised learning based on modified Hebbian algorithms are being developed [3]. In the future, when neural network computers become widely available, we expect that shape functions and their transforms may prove to be an effective method of image coding for invariant recognition.

[Sponsored by SPAWAR]

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Library-based Microcomputer Support Services

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One place to go for all kinds of information. An impossible goal? Perhaps, but at the Naval Research Laboratory (NRL), 1989 brought that goal a little nearer to reality.

For over 60 years, the Ruth H. Hooker Technical Library has served as a focal point for meeting the information needs of the researchers and administrators at NRL. Underlying the Library's success as an information provider is its extensive research collection of books, journals, and reports selected for relevancy to the NRL mission and areas of interest. In 1987, in a major departure from its almost exclusive reliance on print media, the Library began to consider adding microcomputer software to the types of material with which it deals.

The impetus for expanding the library collection and services into the microcomputer software area was a proposal by an NRL researcher to the Laboratory's Computer Policy Panel that the Library purchase software for employees just as it purchases books and journals. Although such expanded procurement authority was not granted, once the Library's role in supporting Laboratory software needs was

addressed, several avenues for improving software availability and facilitating its implementation and use became evident. The first of these to be pursued was a software lending program, paralleling the circulation of bibliographic materials. A concurrent effort was the expansion of reference services to assist users in the identification and selection of microcomputer software for particular types of applications. After a period of planning and implementing, the Library opened a fully equipped and staffed Microcomputer Software Support Center that serves as a one-stop facility to address all facets of microcomputer software support.

Lending Software: In July 1988, the Library added commercial software packages to the materials it lends to Laboratory staff, starting with 10 of the most popular programs for IBM-compatible computers. This was a new approach for the Library in meeting Laboratory information needs arising from the increasing use of microcomputers for both office and research applications. Getting software into the hands of the users so they can test and evaluate it on their own machines is a major step beyond earlier Library efforts to provide staff with information about software through the purchase of relevant materials and searches of computerized databases covering the computer field.

Underlying the circulation of software are a number of carefully worked out controls and procedures to assure that the rights of the software publisher are properly observed and to provide the user with assurance that the software is complete and safe for use. Prospective users are asked to register as software borrowers by signing an agreement not to make or allow others to make copies. While the software may be copied to a hard disk for test and evaluation, any such copy must be erased before the package is returned to the Library. Upon returning the software, each user verifies in writing that no other copy exists. After each circulation, the software is checked for viruses using two types of antiviral programs, one that checks for specific viruses and the other that checks for changes in the disk by comparing it to the original. The computer used for checking has no hard disk so could not itself become infected.

At first, the software purchased for circulation were the more popular office-automation types of programs: word processing, spreadsheets, graphics, and database programs. It quickly became evident that NRL users were perhaps even more interested in having scientific software available for evaluation as well. Model simulation, mathematics solvers, neural computing, optical design, pattern recognition, and signal processing programs were soon added.

About 6 months into the program, all registered software borrowers were surveyed on their satisfaction with the lending program. Eighty users responded to this survey: 49 rated the program as excellent, 30 as satisfactory, and 1 as poor. Fifty-six believed the capability to "try before you buy" had saved them money. All recommended that the Library continue the program. A large number of respondents included comments on specific ways they had benefitted from the program. Many were variations on the theme that by testing and evaluating software they had avoided making inappropriate purchases and had saved both money and staff time they might have otherwise spent in implementing an unsatisfactory program.

By January 1990, the lending collection had grown to over 300 packages and included both IBM-compatible and Macintosh software. Lending services, which were originally limited to NRL employees, had been extended to the Office of Naval Research and to NRL on-site contractors as well. Over 400 users had registered as software borrowers. During calendar year 1989, there were 1,590 loans of software for test and evaluation purposes (Fig. 17).

Specialized Software Information Services: Lending software is an important first step in assisting users to identify the best available package for their particular needs. Although the

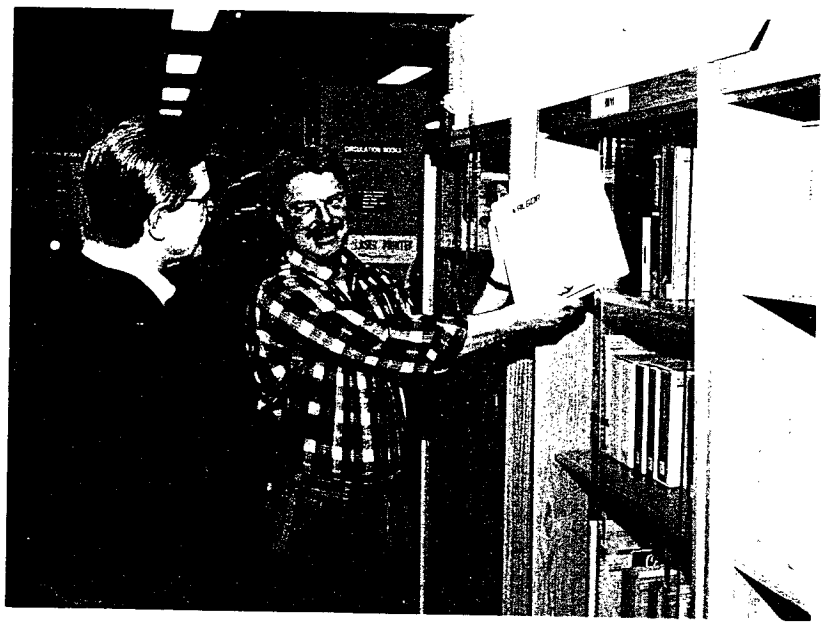

Fig. 17 — Dr. Terry Royt, of the Applied Optics Branch, is assisted by Laine Howell of the Microcomputer Software Support Center in selecting software for test and evaluation from the more than 300 packages available from the NRL Library for test and evaluation

Fig. 18 — Center manager, Dennis Blakey, searches an in-house database indexing and abstracting scientific software for Dr. Herbert Gursky, Superintendent of the Space Science Division

library reference staff were conversant in using existing catalogs and manuals and in searching online databases for software information, users appeared to need to interact with someone who had extensive microcomputer experience and who could serve as an advisor, or software "guru." In October 1988, the Library took advantage of an existing Research Computation Division contract to bring such a person on board to serve as the principal contact for users requiring software information and to participate in the planning for future support services.

To provide users with quickly accessible software information, a CD ROM product, which indexes over 130 computer publications and provides full text of the contents of some major magazines, was introduced. This product is available to end-users and is also used by Library and contract staff to respond to inquiries about particular software packages or types of products. In addition to descriptions of particular programs, evaluative articles that compare and rate packages with a similar purpose can be quickly located to assist in selection.

To meet the need for information about scientific software, which is not always readily available, the staff created an in-house database, called the scientific software database (Fig. 18). To lay the foundation for this database, various catalogs and directories were searched, and commercial vendors, government facilities, universities, and laboratories were contacted for current information on scientific software they had developed. The database indexes and in many

Fig. 19 — The Microcomputer Software Support Center features IBM-compatible and Macintosh user work stations. In the foreground are specialized newsletters and publications covering the microcomputer industry.

cases abstracts the information content of over 3000 vendor brochures. The brochures themselves are all on file and can be retrieved by a database search. Such searches have assisted users in identifying and selecting software in such diverse research areas as civil engineering, chaos, linear analysis, chemical structure modeling, optics, and neural systems.

An additional information source in the form of newsletters issued by computer user groups, software manufacturers, and industry associations was introduced to help users stay abreast of the software field. This information complements the more formal publications that have traditionally been part of the Library collection.

Microcomputer Software Support Center: Providing a one-stop location where users could get information about and assistance in using software was a part of the Library's overall plan from the start, but space limitations made this seem a distant goal. However, in late 1988, a change in program priorities and space allocations freed a computer room located within the Library. With a place to put a microcomputer center, the Library, with its contractor staffing, began to design a facility, order equipment and furnishings, and plan for expanded services.

The Center opened for business with a ribbon cutting by NRL's Commanding Officer, CAPT John Donegan, on 7 September 1989. Located in Room 348 of Building 43, the new Center offered IBM-compatible and Macintosh workstations for on-site use of software, a CD ROM user station for information searches and downloading of public domain software, a video station with software tutorials for individual or group use, a microcomputer for searching the scientific software database, and IBM and Macintosh virus-checking stations (Fig. 19). The staff

dedicated to Center activities and support of the lending program had now grown to three: a manger, a program administrator, and a technician, plus a summer student for data entry, and clerical support. A few months later, as workloads increased, an additional person was added to serve as the primary user contact for advice and training.

The Center was planned to assist NRL staff with the entire spectrum of needs associated with the use of microcomputers in a research environment. Added to the existing information services that had been developed to support the lending activity were now a user evaluation lab, expert assistance, and instructional capabilities. To address a need that had become evident as Center staff became identified throughout the Laboratory as software experts, field support services were introduced. Users can now ask for help in their offices to solve a variety of software-related problems, including configuration and setup, disk recovery, and virus checking. Additional services include vendor demonstrations and the showcasing of new equipment. Under consideration is a role for the Center, not fully defined, in facilitating software procurement through consolidated upgrades, bulk purchases, or site licenses. Center activities planned for the immediate future include a bulletin board system for software information exchange and a newsletter featuring reviews of scientific software along with news items of interest to microcomputer users.

On 30 and 31 October 1989, the Center hosted its first major vendor demonstration. Billed as ScannerFest '89, it featured data input devices and software from 26 vendors, 13 each day. Employees from the Office of Naval Research and Bolling Air Force Base were invited along with NRL staff. Over 550 people attended this event (Fig. 20). An expo highlighting presentation graphics software and devices is scheduled for spring 1990.

Fig. 20 — Some of the 500 participants tryout data input devices at ScannerFest '89

During the last three months of 1989 when the Microcomputer Center was open for business, 119 NRL employees registered to use its various services. Traffic was brisk as users took advantage of the Center's facilities to evaluate software, search the CD ROM and scientific software databases, and confer with the staff. As threats of viruses increased in October and November 1989, the Center's staff answered distress calls and was instrumental in keeping Laboratory micro-computers up and running and in providing peace of mind for concerned computer users.

In its few short months of operation, the Microcomputer Software Support Center has become an accepted and successful information facility that is well utilized by NRL staff. It has become NRL's "reference service" with a capital "R."

Want the latest research paper on superconductivity and advice on using Mathematica? What could be more natural? Go to the Library. ■